CLAIMS

1. Fuel assembly (3) for a pressurised water nuclear reactor, of the type comprising fuel rods which are arranged at the nodes of a substantially regular network having a polygonal outer contour, the fuel rods containing uranium which is enriched in isotope 235 and not containing any plutonium before the assembly is used in a reactor, characterised in that the rods are distributed in at least:
- a first central group which is constituted by fuel rods which have a first level of nuclear reactivity, and optionally rods which contain a neutron contaminant, and
- an outer peripheral layer (13) of fuel rods having a level/levels of nuclear reactivity which is/are strictly less than the first level of nuclear reactivity.

2. Assembly according to claim 1, characterised in that the rods of the peripheral layer (13) are distributed in:
- a second group of fuel rods which extend along the faces (15) of the outer contour of the network and which have a second level of nuclear reactivity which is strictly less than the first level of nuclear reactivity; and
- a third group of fuel rods which are arranged at the corners of the outer contour of the network and which have a third level of nuclear reactivity which is strictly less than the second level of nuclear reactivity (Figures 2 and 6).

3. Assembly according to claim 2, characterised in that the second group extends, for each face (15) of the outer contour of the network of fuel rods, from one corner to the other of the face in question, and in that the third group comprises only the fuel rods which are arranged in the corners of the outer contour of the network of fuel rods (Figure 2).

4. Assembly according to any one of the preceding claims, characterised in that the different levels of nuclear reactivity of the fuel rods of the various groups are obtained by means of different masses of uranium 235 in the fuel rods.

5. Assembly according to claim 4, characterised in that the different levels of nuclear reactivity of the fuel rods of the various groups are obtained by means of the fuel rods having different levels of enrichment (e1, e2, e3) in uranium 235.

6. Assembly according to claim 2 or 3, taken in combination with claim 5, characterised in that:
- the rods of the first group have a first level of enrichment e1 in uranium 235,
- the rods of the second group have a second level of enrichment e2 in uranium 235 which is strictly less than the first level of enrichment e1, and
- the rods of the third group have a third level of enrichment in uranium 235 which is strictly less than the second level of enrichment e3.

7. Assembly according to claim 6, characterised in that the second level of enrichment e2 is between e1-0.8% and e1-0.2%.

8. Assembly according to claim 6 or 7, characterised in that the third level of enrichment e3 is between e1-1.8% and e1-0.6%.

9. Assembly according to any one of claims 6 to 8, characterised in that the first level of enrichment e1 is between 3% and 6%.

10. Assembly according to any one of the preceding claims, characterised in that the fuel rod network (3) has a square outer contour.

11. Nuclear reactor core, characterised in that it comprises fuel assemblies (3) according to any one of the preceding claims.